

### REMARKS

Claims 59 through 65 and 68 through 78 are pending. Claims 59 and 70 are hereby amended to better define the invention.

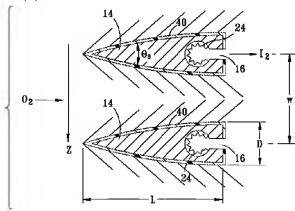
### Objection to Drawings

Claims 68 and 77 recite a heating element. This heating element is described, among other places, at page 27, lines 5-13 as follows (emphasis added):

A typical length in the direction of oxygen flow,  $L$ , for a strut would be about 1 cm with an angle  $\theta_s$  (where  $\theta_s$  refers to the angle on the strut) of  $20^\circ$  or less. The angle  $\theta_s$  preferably ranges from  $5^\circ$  to  $45^\circ$ , and most preferably is around  $20^\circ$  or less. **The struts have a coating 40 and have heater elements 24.** Coating 40 may be Teflon, nylon, or other plastic material. FIGURE 5 shows the possibility of using one or two small fins 26 or of using oblong orifices 16. The purpose of using fins or oblong orifices is to assist in the rapid formation of an iodine layer near the base of each strut if necessary or desired. (Emphasis added)

The referenced heating elements 24 are illustrated in Figures 4(a) - 4(c). For example, Figure 4(a) is as follows:

FIG. 4 (a)

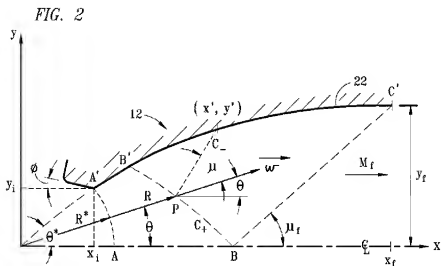


In view of the discussion and illustration of the heating elements 24, Applicant submits that the objection to the drawings on this basis is not well taken. Reconsideration and withdrawal is respectfully solicited.

Similarly, the curved sonic line is described in the specification as follows, at page 18, lines 5-7:

Referring to FIGURE 2, the sonic line of MLN 12 has a radius  $R^*$  and extends from point A' at wall 22 to point A on the centerline (along the x axis).

The referenced sonic line is illustrated in Figure 2, extending from point A to point A':

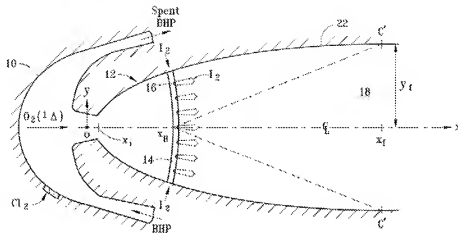


Again, the drawing objection is not well-taken. Reconsideration and withdrawal is respectfully solicited.

## Rejections under 35 U.S.C. § 112

Applicant has made several amendments to independent Claims 59 and 70. These amendments have rendered the rejections under 35 U.S.C. § 112 moot. Support for the claim amendments may be found in the specification, for example, by inspection of the drawings:

FIG. 1



**Rejections under 35 U.S.C. § 103**

Of the pending claims, not all are rejected as obvious. Only Claims 59-65, 69-76 and 78 stand rejected under 35 U.S.C. § 103 as obvious due to Pinsley in view of Dickerson. Claims 54-58, 68 and 77 are therefore deemed allowable, except for any objection under 35 U.S.C. § 112. Applicant submits that the latter objections have been overcome by the claim amendments.

The Pinsley reference discloses a gas dynamic mixing laser, and FIGS. 1-3 and their descriptions are asserted as pertinent. Referring to Pinsley's FIG. 1, gas flows from the reaction chamber 16 through a nozzle array 22 to a chamber 30 that has an optical cavity 32 (note, item "32" is not an "exit plane" as asserted). Each nozzle has a converging section 24 and an expansion section 26. See, Col. 3, lines 63 to Col. 4, line 14. Pinsley does not address the throat of the nozzles and does not indicate any sharp corner within the throat. Instead, FIG. 4 shows a throat that is smoothly curved, lacking any sharp corners. The throat is in the region designated by the arrow from numeral "104" in the drawing. Moreover, the nozzle embodiment of FIG. 3 also does not show a throat with a sharp corner. The throat is at the end of the arrow from numeral "22." Pinsley depicts an injector element 92 in FIG. 3. This injector is located in the throat region. While the injector has multiple orifices for injecting gas, it is not located downstream of the throat, but inside the throat, as clearly seen from the drawing.

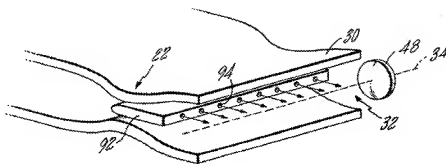


FIG. 3

This drawing shows a throat (designated as the region where the arrow from “22” is pointing) that is devoid of any sharp corners. The drawing of FIG. 1 of Pinsley, referred to as a “simplified cross sectional view” not a detailed engineering drawing, is at a much reduced size. Applicant respectfully submits that it *cannot* fairly be read as depicting a sharp corner at the throat area because, when magnified, as in FIGS. 3 and 4, which are referred to as “simplified schematic diagrams,” there are *no sharp corners in the throat region*. Moreover, the Pinsley specification nowhere refers to a sharp corner in the throat region. Accordingly, *there is no teaching or suggestion to have a sharp corner in a throat*, or of any advantages of such. In contrast, the exemplary embodiment of the presently claimed subject matter, shown in FIG. 1, reproduced above, does show a sharp corner.

Moreover, referring to Claim 59, the Pinsley reference fails to show a nozzle with an exit body portion configured to have an *exit plane* with particular characteristics. The Office Action’s asserted “exit plane 32” is an optical cavity 32 (Col. 4, lines 3-6). The exit plane, as set forth in the claim, is transverse to a flow path of the gas flow through the nozzle. Gas flowing through it is supersonic, and *gas velocity across the width of the nozzle at the exit plane is substantially uniform*. The exit plane is located where tangents drawn to the (opposite) divergently extending curved walls are parallel to the central axis of the nozzle. FIG. 1 of the present application shows an exemplary embodiment of the claimed nozzle and the exit plane may be located from this drawing. For example, the central axis (viewed as an x-axis) has a point  $x_t$  and a plane at right angles to the x-axis through this point would intersect the side walls 22 of the nozzle. This point of intersection corresponds to a point on each side wall where a tangent to the side wall is parallel to the central axis of the nozzle. Such a feature is neither taught nor suggested in either Pinsley or Dickerson, or

the combination of both. Indeed, Dickerson is merely cited for iodine injection. Accordingly, the combination fails to teach or suggest several features of Claim 59, including: a nozzle with a strut located downstream of the throat, a nozzle throat having a sharp corner, and a nozzle configured to provide gas flow through an exit plane, defined as in the claim, such that gas flow is supersonic and at substantially uniform velocity across the width of the nozzle. Reconsideration and allowance of Claim 59 and all of its dependent claims is respectfully solicited.

Claim 70 has many features similar, but not identical, to Claim 59. Therefore, some of the explanations presented above distinguishing claimed subject matter from Pinsley and Dickerson apply here as well and are fully incorporated. As detailed above, Pinsley and Dickerson do not teach a nozzle with a sharp corner in the throat region. Furthermore, Pinsley fails to show a nozzle with an exit body portion configured to have an *exit plane* with particular recited characteristics. The Office Action's asserted "exit plane 32" is an optical cavity 32 (Col. 4, lines 3-6). The exit plane, as set forth in the "wherein clause" of the claim, is transverse to the flow path of the gas flowing from the outlet portion of the nozzle. Gas flowing through the exit plane is supersonic, and *gas velocity at the exit plane is substantially uniform*. The exit plane is located proximate the terminal end of the outlet portion of the nozzle. Such a feature is neither taught nor suggested in either Pinsley or Dickerson, or the combination of both. Indeed, Dickerson is merely cited for iodine injection. Accordingly, the combination fails to teach or suggest several features of Claim 70, including: a nozzle with a strut located downstream of the throat, a nozzle throat having a sharp corner, and a nozzle configured to provide gas flow through an exit plane, located as recited in the claim, such that gas flow is supersonic and at substantially uniform velocity through the plane. Reconsideration and allowance of Claim 70 and all of its dependent claims is respectfully solicited.

**Conclusion**

Applicant does not believe that any fees are due; however, in the event that any fees are due, the Commissioner is hereby authorized to charge any required fees due (other than issue fees), and to credit any overpayment made, in connection with the filing of this paper, to Deposit Account 50-2180 of Storm LLP.

Should the Examiner require any further clarification to place this Application in condition for allowance, the Examiner is invited to telephone the undersigned at the number listed below.

Respectfully submitted,

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Storm LLP  
901 Main Street  
Suite 7100  
Dallas, Texas 75202  
Telephone: (214) 347-4708  
Fax: (214) 347-4799

/Mark D. Perdue/  
Mark D. Perdue  
Reg. No. 36,890